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# (12) UK Patent Application (19) GB (11) 2 264 409 (13) A

(43) Date of A publication 25.08.1993

(21) Application No 9202232.6

(22) Date of filing 03.02.1992

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(51) INT CL<sup>8</sup>  
H04N 5/445

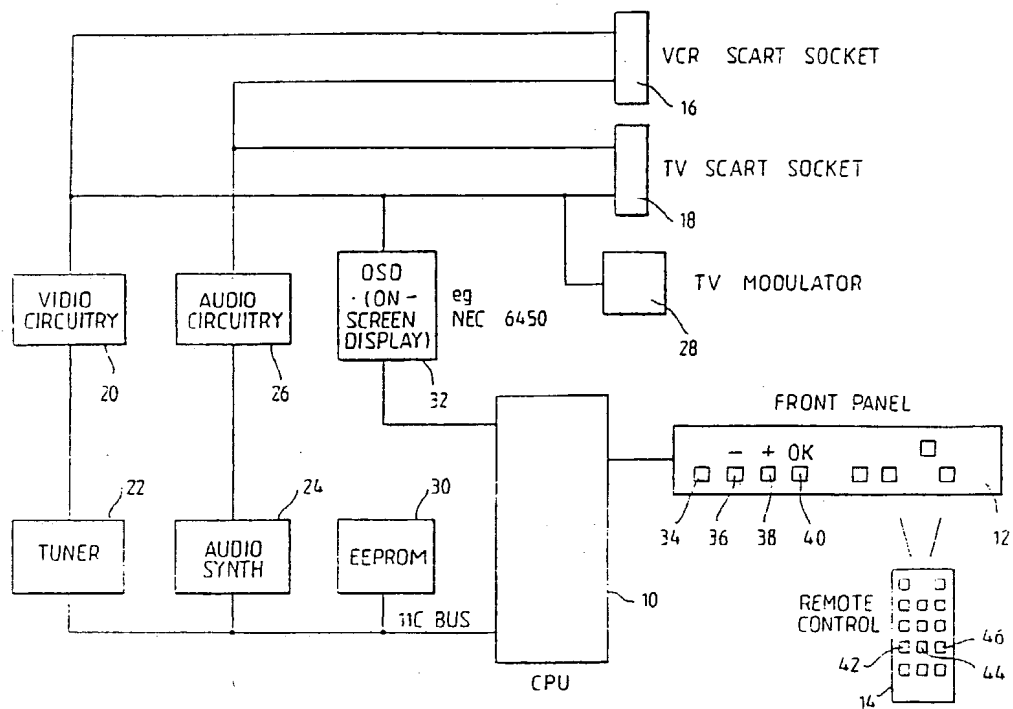
(52) UK CL (Edition L)  
H3Q QLX Q200 Q6F Q6U  
U1S S2206

(56) Documents cited  
GB 1560889 A GB 1508360 A EP 0263555 A1  
US 4894714 A

(58) Field of search  
UK CL (Edition K) H3Q QBCT QLCA QLCX QLX  
INT CL<sup>8</sup> H03J 1/00, H04B 1/06, H04N 5/445

## (54) Television channel display

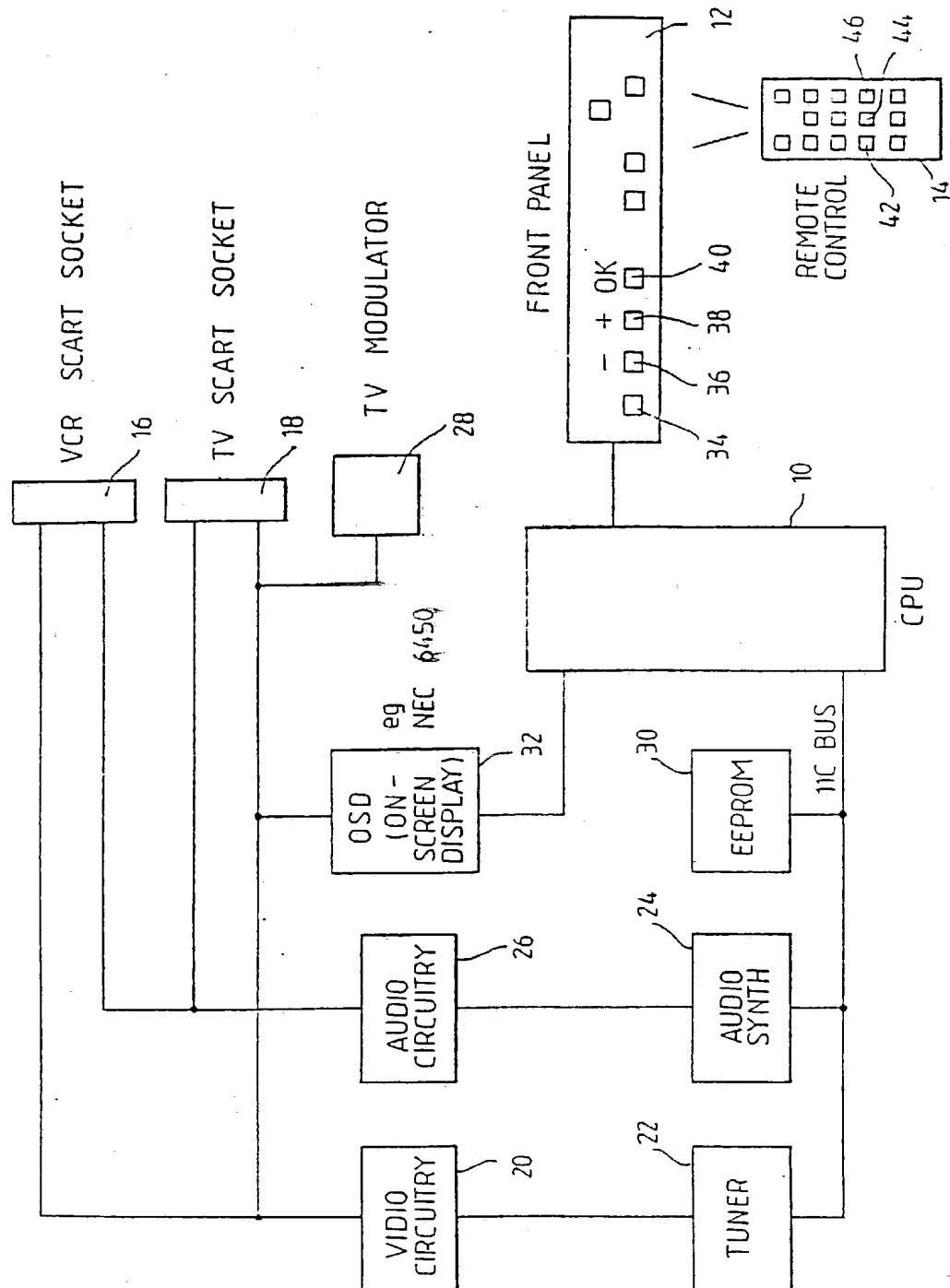
(57) On receipt of a channel display command a CPU (10) in a television receiver reads channel information relating to a channel being viewed or recorded from a EPROM (30) together with similar information relating to a number of adjacent channel numbers. The information is displayed as a menu of, for example, 10 channels via an on-screen display device (32) controlled by the CPU. Scroll up and scroll down buttons (36, 38) enable the display to be changed.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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TELEVISION CHANNEL DISPLAY

This invention relates to television, and in particular to the display of channel information.

It is conventional for a channel identifier to be displayed on screen when a channel is selected, for example from a remote control. In some cases a number corresponding to the remote control channel number is displayed, in other cases a broadcast channel identifier for example 'BBC 1'.

These displays are satisfactory as a check to ensure the right channel has been selected. Where the receiver only receives a limited number of terrestrial broadcasts it is easy to select each tuned channel in turn to remind the user which broadcast channel is tuned to which receiver push button.

With the advent of satellite television the number of channels that may be received has increased drastically. For example, the Astra Satellite transmitting to Western Europe can transmit 48 channels. Most receivers can be tuned to receive 99 channels. Clearly, selecting each channel in turn to check what is being received is cumbersome and time consuming.

The invention aims to overcome this problem and to enable the operator to check easily what channels are being received.

In essence, the invention resides in the provision of an on screen menu which displays some or all of the channels which may be selected.

According to the invention there is provided apparatus for displaying information relating to a plurality of program channels a television receiver can be tuned to receive, comprising a memory means for storing information relating to a plurality of program channels, a processor communicating with the memory, a display device communicating with the processor and controlled thereby to generate characters for display by the receiver, and characterized by control means selectable by the user to instruct the processor to control the display device to generate a display of information relating to a plurality of program channels stored in the memory means.

The invention also provides apparatus for displaying a menu of television channels which can be received by a television receiver, each channel having an assigned number, comprising a memory means for storing information relating to each channel number, a processor communicating with the memory, a display device communicating with the processor and controlled thereby to generate characters for display by the receiver, and control means selectable by the user to control the processor to read information relating to a plurality of channel numbers from the memory means and to control the display device to generate a menu of channel information from the information read from the memory means.

Embodiments of the invention have the advantage that at the press of a button the user is shown a menu of program channel information enabling the selection of a desired channel.

Preferably, the information displayed includes the channel number and description of the channel which the receiver is tuned to display and a plurality of adjacent channel numbers.

An embodiment of the invention will now be described, by way of example only, and with reference to the accompanying drawing which shows a schematic block diagram of a portion of a television receiver embodying the invention.

The figure shows a television receiver central processor unit (CPU) 10 which communicates with a receiver front panel 12. The front panel may include an infrared receiver for receiving instructions from a handset or remote control 14.

The CPU also communicates with VCR and TV scart sockets 16, 18 via video and audio control circuitry. The video control circuitry is shown as general video circuitry 20 and tuner 22. Both the video circuitry and tuner are standard and require no further description. Similarly, the audio path comprises an audio synthesiser 24 and audio circuitry 26.

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Again, both are standard. The output from the video circuitry 20 is also supplied to the TV RF modulator for connection to the TV aerial input.

The CPU 10 also communicates with an electrically eraseable PROM (E<sup>2</sup>PROM) 30 and an on-screen display device 32. The on-screen display device may, for example, be an NEC 6450 on-screen character display chip of the type commonly used in video cassette recorders for displaying menus such as recording start and stop times on the screen. It allows for characters to be displayed on a coloured background. The display chip 32 has an output to the TV Scart socket 18 and the TV modulator to enable on-screen display.

The front panel 12 is provided with a channel display push button 34 together with scroll up and scroll down buttons 36 and 38 and a select button 40. Before the function of these buttons is described in detail it should be appreciated that they may be provided additionally or alternatively as the remote control handset 14.

E<sup>2</sup>PROM 30 stores tuning, audio information and identifying names for 99 separate channels. Conveniently each name may be up to 8 characters long. In practice, E<sup>2</sup>PROM 30 may be loaded at the factory with default values for tuning and audio for some channels as transmitted by existing satellites.

The user may change any of the information stored in E<sup>2</sup>PROM 30 using the handset 14 in the following manner,

Once the channel required is flashing, for example channel 90, the user presses on O.K. button, for example button 42 on the handset 14. As a result, the CPU 10 and the on-Screen Display OSD 32 cause channel information to be displayed on screen. This will include at least the following display:

CUSTOMISE	CH.90
CH NAME	SC.SPORT
DISH	A

CH SKIP	NO
CH LOCK	ON>
CH FREQ	1318

Other details such as dish polarisation and audio mode may also be displayed. The first character of the channel name will flash and by pressing the select + or - button 44,46 on the handset the display will step forwards or backwards through the character set of OSD 32. For the NEC 6450 chip this set is the set of letters A-Z, numerals 0-9 "blank" and . : - characters. Once the desired character is displayed the O.K. button 42 is pressed and the next character flashes. The process is repeated until the complete program identifier desired by the user is displayed. If an existing character is correct it may be reselected by pressing O.K. button 42. After the final character, the O.K. button is pressed again and the display is finalised and stored in E<sup>2</sup>PROM 30.

Thus, the E<sup>2</sup>PROM contains channel identifiers which are selected as desired by the user or display factory programmed information. The channel display circuitry makes use of this stored information in the E<sup>2</sup>ROM. On depression of the channel display button 34 the OSD 32 generates an opaque background display on top of which is displayed the currently selected channel together with the four channels immediately below it and the five channels immediately above. Thus, the display may be as follows:

SIS	CH 5 CHILD CH
	> CH 6 SAT 1
	> CH 7 TV 1000
	CH 8 SKY ONE
	> <u>CH 9 TELECLUB</u>
	> CH 10 3SAT

- > CH 11 FILMNET
- CH 12 SKY NEWS
- > CH 13 RTL-4
- > CH 14 PRO 7

In the example above the currently selected channel is channel 9 and it is shown as underlined to indicate that the display will flash to highlight that channel. The arrow on the left of the channel number indicates that a lock has been placed on that channel to prevent unauthorised access, for example by children.

If the user wishes to view channel 9 the O.K. button 40 is depressed and channel 9 remains selected. If, however, a different channel is to be viewed or the programs received by other channels are to be reviewed, either by the scroll up or scroll down buttons are depressed. On the first depression of, for example, scroll down 36 the flashing highlight moves down from channel 9 to channel 8 but the display remains the same. However, when the top line of the screen is reached, further depression of the channel down button scrolls the display down such that the display will now be channels 4 - 13 as shown below:

SIS    CH 4 CHAN.4  
CH 5 CHILD CH  
> CH 6 SAT 1  
> CH 7 TV 1000  
CH 8 SKY ONE  
> CH 9 TELECLUB  
> CH 10 3SAT  
> CH 11 FILMNET  
CH 12 SKY NEWS  
> CH 13 RTL-4



After the highest channel number or the lowest channel number a barred line is displayed as a visual separator followed by the lowest channel number. The barred line may be fifteen characters of hexadecimal 3F. Thus, the display will be as follows:

```
SIS      CH 95
          CH 96
          CH 97
          CH 98
          CH 99
          |||||
          CH 1  SC.SPORT
          CH 2  RTL-PLUS
          CH 3  TV3 SVEN
          CH 4  CHAN.4
```

In the above example channels 95 - 99 do not have program identifiers.

Similarly, from the example first shown above depressing scroll up nine times would display a row of fifteen bars at the top following by channels 1 - 9 underneath.

A further depression of the channel display button facilitates page advance and displays the next ten channels to those currently displayed, regardless of the highlight position. The highlight may be repositioned at line 5. Once the required channel is highlighted the user presses the select button 40 and that channel is selected. A short term display (for example four seconds) of the channel number and the channel name may be displayed superimposed on the video picture, for example with the channel number in the right-hand corner of the display and the channel name on the bottom left-hand corner.

If a newly selected channel contains no transmission, the characters are displayed on a black screen together with the message NO SIGNAL at the bottom right-hand corner.

The effect of pressing the channel select button 40 is that the CPU 10 receives from the E<sup>2</sup>PROM the tuning and audio information for the highlighted channel and sends this information to the tuner and the audio synthesisers. It also sets up other switching routes within the receiver, exactly as if the channel had been selected from the numeric keypad on the remote control or selected with the conventional channel up or channel down key on the remote control 14 of the front panel 12.

The information stored in the E<sup>2</sup>PROM is conveniently stored in compressed form to save space. Thus, depression of the channel display button on either the remote control or the front panel causes the CPU to retrieve the names of ten channels including the current channel from the E<sup>2</sup>PROM. The names are first decompressed by the CPU and the resultant display codes sent to OSD 32 to produce the tabulated display.

The nature of the display may be varied as desired. For example, the number of channels displayed may be varied and the exact format of the display may be varied.

CLAIMS:

1. Apparatus for displaying information relating to a plurality of program channels a television receiver can be tuned to receive, comprising a memory means for storing information relating to a plurality of program channels, a processor communicating with the memory, a display device communicating with the processor and controlled thereby to generate characters for display by the receiver, and characterized by control means selectable by the user to instruct the processor to control the display device to generate a display of information relating to a plurality of program channels stored in the memory means.
2. Apparatus according to claim 1, wherein the information relating to the plurality of program channels includes a channel number and a channel description.
3. Apparatus according to claim 2, wherein the display generated by the display device comprises the channel number and channel description of the program currently being received, and the channel number and channel description of a plurality of channels adjacent the program currently being received.
4. Apparatus according to claim 2 or 3, wherein the channel description stored in the memory is definable by the user.
5. Apparatus according to any preceding claim, wherein the control means comprises a control on the receiver.
6. Apparatus according to any preceding claim, wherein the control means comprises a control on a remote control handset.

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7. Apparatus according to claim 5 or 6 wherein the control is a push button switch control.

8. Apparatus according to claim 5, 6 or 7, wherein the control means comprises means for incrementing and decrementing the program information displayed.

9. Apparatus according to claim 5, 6, 7 or 8 wherein the control means comprises a selector means for selecting a selected one of the program channels information about which is displayed.

10. Apparatus for displaying information relating to the program channels a television receiver is tuned to receive substantially as herein described with reference to the accompanying drawing.

11. A television receiver including apparatus according to any preceding claims.

12. Apparatus for displaying a menu of television channels which can be received by a television receiver, each channel having an assigned number, comprising a memory means for storing information relating to each channel number, a processor communicating with the memory, a display device communicating with the processor and controlled thereby to generate characters for display by the receiver, and control means selectable by the user to control the processor to read information relating to a plurality of channel numbers from the memory means and to control the display device to generate a menu of channel information from the information read from the memory means.

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13. A method of generating and displaying a menu of television channels which can be received by a television receiver, comprising assigning to each channel a channel number, storing in a memory identification information relating to each channel number, and selecting a menu display, wherein the channel numbers and identification relating to a plurality of channels are read from the memory and displayed on the receiver display.

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Patents Act 1977  
Examiner's report to the Comptroller under  
Sec 17 (The Search Report)

Application number

9202232.6

Relevant Technical fields

(i) UK CI (Edition K ) H3Q (QBCT, QLCA, QLCX, Q LX)  
(ii) Int CL (Edition 5 ) H03J 1/00, H04B 1/06, H04N  
5/445

Search Examiner

D MIDGLEY

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

25 JUNE 1992

Documents considered relevant following a search in respect of claims

1-13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1560889 (TOKYO) whole document	1-3, 5-9 11-13
X	GB 1508360 (SONY) whole document	"
X, &	EP 0263555 A1 (PHILIPS) whole document	"
X, &	US 4894714 (PHILIPS) whole document	"

SF2(p)

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Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

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